

CLAIMS

What is Claimed Is:

1. A method for automatic classification of music, comprising:
 - receiving a music piece to be classified;
 - determining when the received music piece comprises human singing;
 - labeling the received music piece as singing music when the received music piece is determined to comprise human singing; and
 - labeling the received music piece as instrumental music when the received music piece is not determined to comprise human singing.
2. The method according to claim 1, wherein the received music piece is comprised of at least music sounds, and wherein the music piece can include one or more of audiovisual signals and/or non-music sounds.
3. The method according to claim 1, wherein the presence of human singing on the received music piece is determined by analyzing a spectrogram of the received music piece.
4. The method according to claim 1, including:
 - classifying the labeled singing music piece as either chorus music or solo music, based on frequency vibrations in the singing music piece.
5. The method according to claim 1, including:
 - classifying the labeled singing music piece as either chorus music or solo music, based on spectral peak tracks in the singing music piece.

6. The method according to claim 5, wherein the singing music piece is classified as solo music if significant peaks of harmonic partials are found above the 2000 - 3000 Hz range in the singing music piece.

7. The method according to claim 5, including:
classifying solo music as either male vocal solo or female vocal solo, based on the range of pitch values in the solo music piece.

8. The method according to claim 7, wherein the solo music piece is labeled as male vocal solo if the range of most of the pitch values in the solo music piece are lower than a predetermined first threshold and if at least some of the pitch values in the solo music piece are lower than a predetermined second value, wherein the second threshold is a lower pitch value than the first threshold.

9. The method according to claim 8, wherein the solo music piece is labeled as female vocal solo if the solo music piece does not satisfy the pitch range thresholds for male solo vocal.

10. The method according to claim 1, wherein the labeled instrumental music piece is analyzed for occurrences of features indicative of symphonies, and wherein if at least one symphony feature is detected in the instrumental music piece, the instrumental music piece is labeled as symphony.

11. The method according to claim 10, wherein the symphony features include repetition, contrast, and variation of music signal or energy over time; sonata-allegro form; binary form; rondo form; regularities in movements; and alternating high and low volume intervals.

12. The method according to claim 10, including comparing the symphony music piece against one or more music segments exemplary of a specific band, wherein the symphony music piece is labeled as a specific band music piece if the symphony music piece matches at least one exemplary music segment.

13. The method according to claim 10, when the instrumental music piece has not been labeled as symphony, comprising:

segmenting the instrumental music piece into notes by detecting note onsets;
and detecting harmonic partials for each segmented note,
 wherein if note onsets cannot be detected in most notes of the music piece
and/or harmonic partials cannot be detected in most notes of the music piece, then labeling
the instrumental music piece as other instrumental music.

14. The method according to claim 13, when the instrumental music piece has not been labeled as other instrumental music, comprising:

 comparing note feature values of the instrumental music piece as matching
sample notes of an instrument,

 wherein when the note feature values of the instrumental music piece match
the sample notes of the instrument, labeling the instrumental music piece as the specific
matched instrument, and otherwise labeling the instrumental music piece as other harmonic
music.

15. The method according to claim 1, wherein the labeled music piece is written
into a library of classified music pieces.

16. The method according to claim 15, wherein the labeling and/or the writing of
the labeled music piece is controlled by parameters selected by a user.

17. The method according to claim 16, wherein the user selects a hierarchical structure of categories for controlling the classification of the music piece.
18. The method according to claim 17, wherein the labeled music piece is written into a hierarchical database according to the structure selected by the user and wherein the labeled music pieces in the hierarchical database can be browsed according to the hierarchy.
19. A method for classification of music, comprising:
 - selecting parameters for controlling the classification of a music piece, wherein the selected parameters establish a hierarchy of categories for classifying the music piece;
 - determining, in a hierarchical order and for each selected category, when the music piece satisfies the category;
 - labeling the music piece with each selected category satisfied by the music piece; and
 - when the music piece satisfies at least one selected category, writing the labeled music piece into a library according to a hierarchy of the categories satisfied by the music piece.
20. The method according to claim 19, including:
 - selecting parameters for subsequent browsing of the library for desired music pieces.
21. The method according to claim 19, wherein the categories include instrumental, singing music, symphony, a specific band, specific instrument music, other harmonic music, chorus, and vocal solo.
22. A computer-based system for automatic classification of music, comprising:
 - a device configured to receive a music piece to be classified; and

a computer configured to:

determine when the received music piece comprises human singing;

label the received music piece as singing music when the received music piece is determined to comprise human singing;

label the received music piece as instrumental music when the received music piece is not determined to comprise human singing; and

write the labeled music piece into a library of classified music pieces.

23. The method according to claim 22, wherein the presence of human singing on the received music piece is determined by analyzing a spectrogram of the received music piece.

24. The method according to claim 22, including:

classifying the labeled singing music piece as either chorus music or solo music, based on frequency vibrations in the singing music piece.

25. The method according to claim 22, including:

classifying the labeled singing music piece as either chorus music or solo music, based on spectral peak tracks in the singing music piece.

26. The method according to claim 25, including:

classifying solo music as either male vocal solo or female vocal solo, based on the range of pitch values in the solo music piece.

27. The method according to claim 22, wherein the labeled instrumental music piece is analyzed for occurrences of features indicative of symphonies, and wherein if at least one symphony feature is detected in the instrumental music piece, the instrumental music piece is labeled as symphony.

28. The method according to claim 27, including comparing the symphony music piece against one or more music segments exemplary of a specific band, wherein the symphony music piece is labeled as a specific band music piece if the symphony music piece matches at least one exemplary music segment.

29. The method according to claim 22, wherein the labeling and/or the writing of the labeled music piece is controlled by parameters selected by a user.

30. The system according to claim 29, including an interface configured to select parameters for controlling the classification of the music.

31. A system for automatically classifying a music piece, comprising:
means for receiving a music piece to be classified;
means for selecting categories to control the classifying of the received music piece;
means for classifying the received music piece based on the selected categories; and
means for determining when the received music piece comprises human singing and/or instrumental music based on the classification of the received music piece.

32. The system according to claim 31, including means for labeling the classified music piece as a particular category of music.

33. The system according to claim 31, including means for selecting control parameters to control, adjust, and/or customize the classifying of the music piece.

34. A computer readable medium encoded with software for automatically classifying a music piece, wherein the software is provided for:
determining when a music piece comprises human singing;

labeling the music piece as singing music when the music piece is determined to comprise human singing; and

labeling the music piece as instrumental music when the music piece is not determined to comprise human singing.

35. The method according to claim 34, wherein the presence of human singing on the music piece is determined by analyzing a spectrogram of the received music piece.

36. The method according to claim 34, including:
classifying the labeled singing music piece as either chorus music or solo music, based on spectral peak tracks in the singing music piece.

37. The method according to claim 36, wherein the singing music piece is classified as solo music if significant peaks of harmonic partials are found above the 2000 - 3000 Hz range in the singing music piece.

38. The method according to claim 34, wherein the labeled instrumental music piece is analyzed for occurrences of features indicative of symphonies, and wherein if at least one symphony feature is detected in the instrumental music piece, the instrumental music piece is labeled as symphony.

39. The method according to claim 38, wherein the symphony features include repetition, contrast, and variation of music signal or energy over time; sonata-allegro form; binary form; rondo form; regularities in movements; and alternating high and low volume intervals.

40. The method according to claim 34, wherein the labeled music piece is written into a library of classified music pieces.

41. The method according to claim 40, wherein the labeling and/or the writing of the labeled music piece is controlled by parameters selected by a user.

42. The method according to claim 41, wherein the labeled music piece is written into a hierarchical database according to a hierarchical structure of categories selected by the user and wherein the labeled music pieces in the hierarchical database can be browsed according to the hierarchy.